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A COMPARATIVE STUDY OF STRAINS OF MARQUIS WHEAT

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INTRODUCTION

A study of Marquis wheat was undertaken in 1925 at the University of Saskatchewan in order to ascertain the differences existing within and among representative strains of this variety. The investigation was prompted by the discovery that individual farmers, in attempting to originate their own special strains of Marquis from single head selections made in the field, were producing strains some of which were not of Marquis type. It is a well recognized fact that off-types† and admixtures are found in Marquis fields. While the cause of most of the mixtures may be explained fairly readily the origin of the off-types is a problem requiring solution.

Variations within varieties of cereals are by no means uncommon. Stadler (13) ‡ in 1924 investigated the differences between separate commercial stocks of two varieties of oats and three of wheat. He found a greater difference between the yields of different stocks of the same variety than between the yields of distinct varieties. In 1925, Coffman, Parker and Queensberry (4), in their study of variability in the Burt oat, found it to consist of rather diverse strains which differed among themselves far more than some closely related but distinct varieties differ from one another. Wiggans (17) studied variations in morphological varieties of oats and barley and found that in some varieties the differences between strains were quite large and in others small. Two representatives of Swedish Select (grown under the names White Russian and Lincoln) differed in yield during a five year period by an average of $29.5 \pm 3.3\%$. None of seven representatives of Victor (grown under the names of Egyptian, Garton No. 306, Victor, etc.,) differed from one another significantly in yield.

The many cereal varieties that have arisen as selections from others bear witness to the lack of uniformity that may exist in common varieties. Some familiar examples are Fultz wheat selected from Lancaster (2, p. 199) by Abraham Fultz, Early Red Fife wheat selected by C. E. Saunders (11) from Red Fife, Kitchener wheat obtained from Marquis by S. Wheeler (1) and Hannchen barley selected from Hanna (8, p. 141) in Sweden.

Sometimes varieties are not what they are called. Clark, Martin and Ball (3) Etheridge (6) and Wiggans (16), when they attempted varietal

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†Plants differing from Marquis in at least one character but not identified as any other named variety.

‡Reference is made by number to literature cited on page 104.

classification of wheat, oats and barley, respectively, found frequent cases where different varieties were known by the same name and many others where one variety had several names. There are various ways in which this state of affairs could come about. For example, an immigrant brings wheat seed to this country from Europe without knowing its name. A neighbor later obtains seed from him, observes that the variety looks something like, let us say, Marquis and forthwith calls it Marquis. It changes hands as Marquis and the origin is soon lost in obscurity.

The importance of a study of Marquis variability at this time hardly needs explanation. Marquis is by far the predominating wheat variety in Western Canada. Thousands of bushels of registered seed of Marquis are sold annually. To be eligible for registration by the Canadian Seed Growers' Association, the seed must conform to rigid standards of type, vigor and purity. There are various off-types in Marquis which ordinarily pass unnoticed but which if propagated as pure lines would not be accepted for registration as typical Marquis. Several questions arise in this connection. First, what is the frequency and nature of off-types in the leading Marquis strains in Western Canada? Second, are any of these strains free from off-types? Third, how do these strains compare with representative common strains of Marquis? Fourth, are the leading strains sufficiently distinct in character to be identifiable?

This study is divided into two parts. Part 1 is a comparison of several different strains of Marquis for various morphological and physical characters. Part 2 is a study of a large number of single plant progenies from one of the Marquis strains.

1. A COMPARATIVE STUDY OF MARQUIS STRAINS.

The first Marquis wheat tested outside of Ottawa was grown at Indian Head in 1907. In 1909 this variety was tested at a number of experimental farms in Western Canada and was grown in a small way by farmers who had secured seed. Since 1909 Marquis has been grown on millions of acres in the United States and Canada, and probably has been handled by fully a million people. Scores of individual farmers and experiment stations have studied Marquis in fields and plots and many of them have sought to improve their seed by the isolation of pure strains. A number of these strains have been produced in Western Canada, chiefly in Saskatchewan. Most of them look much alike but close inspection and tests reveal differences.

MATERIALS.

For the present study 15 supposedly Marquis strains were selected and numbered I to XV. According to the origin (see Appendix) these strains fall into four groups as follows:

Group 1. Strains received from Saskatchewan farmers and as far as known not improved by them. This group consists of strains V, VII, VIII, IX, X and XV.

Group 2. Strains obtained from experiment stations and supposed to be unselected progeny of Marquis originally grown at the Central Experimental Farm, Ottawa. Strains I and XI comprise this group.